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How do Markov approximations compare with other methods for large spatial data sets?

David Bolin, Finn Lindgren

(Submitted on 10 Jun 2011 (v1), last revised 4 Nov 2011 (this version, v2))

The Mat\'ern covariance function is a popular choice for modeling dependence in spatial environmental data. Standard Mat\'ern covariance models are, however, often computationally infeasible for large data sets. In this work, recent results for Markov approximations of Gaussian Mat\'{e}rn fields based on Hilbert space approximations are extended using wavelet basis functions. These Markov approximations are compared with two of the most popular methods for efficient covariance approximations; covariance tapering and the process convolution method. The results show that, for a given computational cost, the Markov methods have a substantial gain in accuracy compared with the other methods.

Comments:	Updated title and revised Section 4 to clarify the simulation setup
Subjects:	**Computation (stat.CO)**
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